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Hospitality solid waste minimization: a global frame

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Environmentally responsive hospitality solid waste minimization (SWM) programs and practices are urgently needed. A strategic SWM approach means first implementing material elimination or reduction. Second, institute procedures to reuse and extend product life. Third, seek avenues to recycle waste prior to resorting to disposal. Two perspectives to guide SWM efforts are described. The biosphere perspective highlights the interdependent nature of our global environment. The life-cycle analysis perspective assesses cradle-to-grave impacts of SWM alternatives. Together, these views and practices can result in cost avoidance, can enhance consumer image and employee morale, and can lessen environmental impacts.

Key words: environment solid waste minimization life-cycle analysis
source reduction recycling

Introduction

Futurists Isaac Asimov and Frederik Pohl state, 'It is already too late to save our planet from harm . . . but we still have time to save, or restore, a large part of the gentle and benevolent environment that has made our lives possible' (Asimov and Pohl, 1991). This article is responsive to global concerns in presenting approaches to, and the rationale and benefits of, environmentally-responsible solid waste programs and practices in the hospitality industry. The information provided speaks to both macro and micro environmental views in reviewing and managing hospitality operations. The objective of this encompassing review is to provide an holistic frame of reference to guide hospitality decision-makers in minimizing the quantity and harmful nature of solid waste generated and discarded.

Hospitality solid waste can be considered as those materials typically discarded by hospitality employees and guests. Included are paper, paperboard, plastics, metals, glass, and back/front-of-the-house food wastes. Also included are landscape wastes, and commonly-overlooked hazardous wastes from hospitality activities such as cleaning, printing, auto detailing, and engineering and maintenance. In the aggregate, such waste materials often are referred to as municipal solid waste, or MSW.

Waste minimization versus waste disposal management

For the purposes of this paper, it is critical to differentiate hospitality waste minimization management, from waste disposal management. Important distinctions exist between the objectives, and therefore, the practices of these two approaches. The differences constitute a recurring theme in managing solid waste (SW). The suggested actions and perspectives in this paper are directed at a minimization style.

Solid waste minimization involves first considering tactics that effectively can ease waste disposal needs by actually quelling the quantity and toxic nature of products used, waste produced, and waste requiring disposal (Ripa di Meana, 1991). Minimization is a proactive and recommended approach for environmentally responsible operations (Ervin, 1991; Wang, 1991). Strategies for waste minimization include source reduction, extension of products' service life, and rechanneling would-be waste to reduce disposal needs (Guide, 1991; Vandermerwe and Oliff, 1992). In this way, relatively less material enters the waste stream than with the waste disposal management approach (cf. Frisch, 1991; Olfenbittel and Stewart, 1991; Wilcock and Haywood, 1991).

The National Environment Policy Programme adopted by the Dutch Government espouses waste minimization in a succinct statement. Their overall environmental philosophy is that, in practical socio-economic terms, sustainable development can only be achieved by: 'preventing, reusing and recycling generated wastes; and preventing the release of environmentally dangerous substances in the disposal of unavoidable wastes' (Jansen, 1990). Multinational proclamations from the June 1992 Earth Summit in Rio de Janeiro echoed this conviction.

In contrast, hospitality solid waste disposal management is a focus on getting rid of waste that already has been generated. This end-of-pipe management mentality only focuses on dealing with SW after the garbage bins are full (Hunt, 1990, 1991). To change waste generation attitudes and behaviors, the Netherlands has had moderate success with their experiment using microcomputer-equipped garbage cans. When disposal customers were charged based on the number of containers-full requiring disposal per month, the number dropped 12.7% in just the first several weeks (Science, 1992).

The ineffectiveness of using solely a 'disposal' focus in SW management is illustrated dramatically in the noxiously-polluted status of Hong Kong's once-pristine harbor. In Chinese, the name Hong Kong means 'fragrant harbor'. But, as noted in the article; 'Pollution Raises a Big Stink', in reality, Victoria Harbor 'really smells' (1991). Today, this watery heart of the city can no longer safely be used for floating restaurants, food harvesting, or for swimming and related activities. The desecrated waters already have endangered and befouled neighboring water supplies, shore habitats, and marine fishing areas. Given that over two million tons of all types of waste are dumped daily into Hong Kong's already waste-choked harbor, obviously the pipe's end is not an effective managerial seat. At best, it is analogous to bailing water out of a leaky, sinking boat, rather than attending to repairing leaks, revising the craft, and reviewing nautical practices.

Solid waste and the hospitality industry

Hospitality waste minimization has as a basis the principle of sustainable development (Smith, 1992). Significantly, the waste minimization assumption is not that all entre-

preneurs are 'green' environmentalists. Certainly it can be assumed that in a commercial enterprise, a manager cannot let altruism dictate all actions, rendering financial considerations unimportant. The payoffs of most SW minimization programs are not in the form of increased revenues. While some programs do make money (Lemonick, 1992), the majority have as their more modest economic goals to avoid costs, to offset costs, and to position for consumer demand (Frankel, 1992; Hemphill, 1991; More, 1991). Cost savings can arise from a variety of sources, including cost reductions on scaled-down materials purchases, handling costs, and disposal-related fees. Offset costs come in such forms as paying more for durable goods and their cleaning and maintenance programs, then balancing these outlays with extended service lives of goods (Ervin, 1991; Smith *et al.*, 1992; Waste, 1991).

Additional waste minimization payoffs take a variety of forms. General Mills Inc. suggests that minimization can serve customer needs and consciences. They also suggest that it often represents a legislative response, or better, a stay on regulation (General, 1990; and cf. Vandermerwe and Oliff, 1992). Minimization can also enhance employee safety and employee liability positions (Ervin, 1991). In addition, as reported by Hard Rock Cafe management, a strong element of pride and intensified morale are associated with waste minimization programs, wherein executives and employees work together responsibly for an important environmental and social cause.

In the past, many hospitality managers may have managed SW as an end-of-pipe process. One explanation for this is that until recently, SW has not been problematic as a by-product of lodging, foodservice, and tour/travel operations. Historically, SW management has been inexpensive, low-profile, and readily routinized. However, Mr Rick Van Warner, editor of *Nation's Restaurant News* (1992) explains that today:

With the more pressing concerns of attracting customers and squeezing out profits, not to mention dealing with other regulatory pressures, the environment has become an afterthought. While not paying much attention to the environment is understandable . . . it is also dangerous.

Thus managers often must provide for themselves the necessary will, awareness and managerial knowledge if any pre-crisis SW minimization action is to be taken (King, 1991b).

Why should hospitality leaders take action? Media headlines continue to herald refuse, garbage, or SW as a major economic, health, safety, and ethical concern (Asimov and Pohl, 1991; Elmer-Dewitt, 1992; Smith, 1992). Hospitality operators not only are in the line of fire, sometimes they are targeted (Cummings and Cummings, 1991; Frisch, 1991; Wilcock and Haywood, 1991). Failure to screen product and material inputs as potential SW outputs can result in public scorn, regulatory handcuffs, and increasing environmental dysfunction (Greenberg, 1992; Hemphill, 1991).

At the property level, hospitality operators increasingly feel very direct consequences of burgeoning landfills and societally-unwelcome waste incinerators. Managers frequently face soaring waste collection, hauling, and other disposal fees. In addition, many hospitality operators face taxes, deposits on delivery and service containers and other packaging, and surcharges on service disposables such as plastic flatware. Certain areas restrict firms from using single service products made of polystyrene foam forms of plastic. Some operators are blocked from using the municipal SW channel for disposing of products such as specific plastics, grease, hazardous wastes (e.g. paint, cleaning products),

phone books, newspapers, white goods (e.g. large appliances), and landscape waste, among others. Also increasing is the expectation or legal requirement that hospitality operators recycle certain materials, adding to the pressure on already-pinched labor, space, and supervisory resources. Collectively, these increment upward managerial costs and 'hassle factors' (King, 1991a; Van Warner, 1992).

Another concern is that members of the public have a disapproving attitude towards the hospitality industry. Ire seems directed especially at the quick service food segment, which some see as a major waste generator (Cummings and Cummings, 1991; Frankel, 1992; Kleiner, 1991). In contrast, archeologist Dr William Rathje's excavation and analysis of the content of numerous U.S. landfills quantifies the waste attributable to fast food packaging as a mere 0.3% by volume (National, 1990; Rathje, 1991). Regardless of the documented facts, consumers' negative attitudes persist. Perhaps their impressions stem from familiarity with the industry's branded disposables which they see constantly in advertisements, in use, and as litter by the roadside. Indeed, a waste minimization mentality is imperative to arrest public criticism and to retain or regain a public image as proactive and socially responsible (Hemphill, 1991; Lemonick, 1992).

Solid waste minimization: an overview

Around the world, the fundamentals for managing waste are based on a hierarchy of commandments; reduce, reuse, recycle (Guide, 1991; Shanklin, 1991). First, look to source reduction; decrease the inflow and use of potential waste items. If a product must be used, arrange to reuse the product as-is; internally or externally. (Some refer to the latter as a type of recycling.) As a last resort before conceding to disposal of materials, seek ways to recycle products or their component materials.

Recycling bias

One development appears to be thrusting its own reordering on the 'reduce, reuse, recycle' hierarchy concept: a bias for recycling. It seems that recycling is perceived as more of a solution than is realistic. Although experts estimate that approximately 60% of waste theoretically is recyclable, this level is several times the best achievements of even the most dedicated programs (Rathje, 1991). Only a few materials, including paperboard and aluminum, are recycled successfully on a broad scale. The market demand for outputs lags, thus the private sector infrastructure for collection, processing, and distribution necessary to recycle most materials simply does not exist in most localities (Quinton and Weinstein, 1991).

Also, in subsequent incarnations of recycled materials, they usually diminish in quality, and reprocessing becomes more resource-intensive. This phenomenon is known as the cascading effect (Ervin, 1991; Hunt, 1990–1991). Recycled products can be viewed as primary, secondary, or tertiary. Primary recycling includes actual reuse, such as returning intact glass bottles and shipping cases for refilling. An example of secondary recycling is re-formed aluminum cans. Tertiary recycling generally involves breaking down the product and producing something else. (Some refer to this molecular-level reprocessing as regeneration, to be differentiated from recycling [Food, 1991].) For example, commingled plastic wastes might be made into parking curbs (which are not

likely to enjoy another 'cycle'). Therefore, while recycling is important in a waste minimization effort, it should be the **THIRD** consideration—after reduce and reuse—not the first.

Hospitality solid waste minimization in practice

Indeed, the greatest degree of waste minimization success in hospitality organizations has been observed and documented in organizations sharing a common set of characteristics, as outlined below. Model organizations include The Hard Rock Cafe, Disney, McDonald's Corporation, Hyatt International, Marriott Corporation, Westin, Harrah's of Nevada, and ARA Food Services, among others.

Executive-level commitment, understanding, and incentive-backed determination (generally economic) probably rank as the three ingredients most needed for success in SW minimization in hospitality operations. This is the opinion of Ken Teeters, the environment-oriented facilities engineer for Harrah's mega-resort in Las Vegas. Other shared elements regarding waste minimization programs include the following.

- (1) Each is energized by commitment from the organization's top. Support is demonstrated via endorsement, recognition, and resources.
- (2) One or more knowledgeable persons are given responsibility, authority, and a budget to make things happen for the program. For example, Disney has instituted a Vice President for Environmental Policy, and at each theme park, Disney has put in place dedicated persons with titles such as Director of Recycling.
- (3) Long-term and indirect contributions are valued. Programs and actions need not be based solely on immediate, direct, economic pay-back.
- (4) The programs begin simply and then expand, based on successes.
- (5) Programs solicit and implement ideas from employees, patrons, and manufacturers/vendors.
- (6) Rather than continuing merely to give lip service to the idea of a better SW program, these firms get educated and get started.

Key actions for hospitality solid waste minimization

Key actions are needed to launch and sustain an effective, comprehensive hospitality waste minimization program. To avoid and minimize the amount and toxicity of materials destined for the waste stream requires a knowledge of (by)-product and packaging inputs into and outputs from the operation. This knowledge must be linked with an understanding of the processes and practices associated with material inputs-outputs. One also must know the actual and potential reuse or waste paths of potential discards. And SW minimization requires an understanding of alternative or substitutable materials, products, and practices (King, 1991b; Hunt, 1990-1991).

A first step in familiarization is to conduct an analysis of the operation's garbage. What materials and products are discarded now, and in what quantities? Include less-obvious waste, such as cleaning agents flushed, and waste from short-lived light bulbs. Then answer the question. Through what changes can specific discards be eliminated, minim-

ized, reused, rejuvenated, recycled, replaced, substituted for, or redesigned? Examine potential changes in policies, facilities, products, product design, materials, delivery, and other practices (cf. Cummings, 1991; Frisch, 1991; Vandermerwe and Oliff, 1992).

A successful program requires monitoring and modifications over time. SW minimization management options are both local and dynamic. Variations in infrastructure, distribution patterns, regulations, and markets are among the reasons for local differences. Consequently, what works in one city at one time may not yet be possible in another. What is impossible today may be the norm in the near future.

For today, fundamental thrusts in hospitality waste minimization management are interrelated actions such as those below.

(1) Eliminate/reduce the toxic substances in products used. Seek alternatives to products requiring harsh pre-use production processes, or post-use re-processing

Substitute non-toxic cleaning agents, and lead-free paints, inks, etc. For example, McDonalds has switched to unbleached brown paper take-out bags, and to oxygen-bleached coffee filters to replace chlorine-bleached items (USEPA, 1991; Waste, 1991).

(2) Minimize overall utilization of natural resources, while eliminating waste elements or reducing their quantities

Use a waste minimization mentality to make decisions about which products will enter the operation, and the post-use path of each. Use efficient, multi-functional products (Hunt, 1990–1991; Shanklin, 1991). Vendors respond to eco-urging. When the Hard Rock Cafe insisted they simply would accept no more merchandise packed in polystyrene pellets, vendors shifted without hesitation (to using shredded junk mail).

(2a) Reduce single service waste. Revise distribution systems to eliminate single service items, or substitute durables; from shipping crates, to paper bathmats, to foodservice paper and ware. For example, when permissible, collect, inspect, and re-serve unused, unadulterated, packaged foodservice condiments (sauce, jelly) rather than discarding them; or allow consumers to self-serve from sanitary bulk dispensers.

(2b) Emphasize reusables/refillables. Germany, Switzerland, and Ontario, Canada have all pressured beverage industries to reverse recent shifts from refillable containers toward disposables. In some cases, refillable containers and deposit requirements are being considered even for many non-food containers such as those for detergents as well as for food/beverage packaging (Young, 1991). And in the private sector, suppliers in Europe and the U.S. have formed coalitions to marshal support for reusable containers (Romeo, 1991). Vendors such as EcoLabs and PepsiCo have developed internal programs to reuse containers.

Provide consumers with reusable containers (e.g. sell refillable mugs) (King, 1991a). In their fledgling program, the University of Wisconsin experienced 7000 student refillable beverage mug reuses in a single week (cf. King, 1991a; Market, 1990; Packaging, 1990; Turning, 1990).

(2c) *Re-specify, rethink, redesign, and modify products and practices to use less waste-destined material.* Streamline the need for and use of disposal-prone packaging. Currently, packaging represents a shocking 65% of the waste stream (Marinelli, 1990). Other ideas: must the room charge folio voucher have seven duplicates? Provide the newspaper only to guests who request it. Consider concentrates and bulk packages. Pump-in liquids from trucks to refill containers, rather than receiving disposable containers. Procure lids for pans rather than using disposable plastic film. Redesign landscapes to incorporate non-shedding and slow-growing plants in order to reduce landscape waste (which averages nearly a fifth of U.S. MSW). Centralize raw food processing, using or rechanneling scraps in volume. To reduce food waste, Marriott Corporation has increased purchases of pre-cleaned, pre-cut produce (Quinton and Weinstein, 1991). Streamline menus and adjust portion sizes to avoid spoilage, leftovers, and consumer plate-waste.

Small redesign changes can make a big difference (cf. Bell, 1990). Darren Blass, Environmental Affairs manager for Jack in the Box fast food chain expects to reduce waste by at least 15% by 1994 through such moves as specifying lighter-weight carry-out bags. The streamlining is expected to save 500,000 pounds of paper annually, equivalent to 4250 trees.

(3) *Optimize and extend the functional lifespan of products*

Systematically maintain, repair, and recondition appliances, furniture, etc. When feasible, remodel rather than scrap. Carefully specify technology for durability, reliability, repairability, upgradability, and migratability (to meet projected changes). This can forestall the need to abandon aging appliances, computers, facilities, etc. (Hunt, 1990–1991; Vandermerwe and Oliff, 1992). In this regard, the European Community is among the international bodies attempting to establish a system which will provide commercial mechanisms as incentives for both waste minimization and product life optimization within a market economy (Hemphill, 1992; Ripa di Meana, 1991).

(4) *Recycle and rechannel wastes*

When recycling appears to be the appropriate post-use path, 'precycle' by buying only goods having a willing nearby buyer/recycler of their waste form (e.g. computer paper, coded plastic). Look to charities, hog feeding operations and the like to divert edible garbage from landfills (S.O.S., 1992). Subscribe to 'waste-exchanges' to investigate other possible alternatives to disposing of waste. One operator's junk may be a needed input to another's operation. Cincinnati Bell Directory Inc.'s waste-exchange subscription (U.S. \$395) is the first in the U.S. to offer computerized, interactive services designed to serve local communities (Templeton, 1992). Such formal waste-exchange data bases are evolving worldwide (Asimov and Pohl, 1991; Smith *et al.*, 1992).

(5) *Help close the reuse/recycling loop*

Operators also must provide a needed market for recycled items by purchasing products containing maximum percents of non-virgin, recycled materials (Quinton and Weinstein, 1991). For example, in attempting to establish a market for recycled polystyrene, McDonald's pledged to purchase much of the plastic lumber output for use in unit construction and landscaping (Kleiner, 1992). (See also, rechanneling wastes.)

Guiding waste minimization: a pair of perspectives

To develop in oneself an orientation for an effective managerial approach, two overlapping sub-perspectives are presented as further suggested guides in making hospitality waste minimization decisions: a biosphere perspective; and a product life-cycle perspective.

A biosphere perspective

The biosphere perspective is an holistic view of environmental concerns. As 'the big picture', the biosphere concept is that actions should be taken with consideration to a broad range of impacts, rather than after considering only the 'here and now'. The idea is, conceptually, to back away from the isolated waste intricacies in one's property in order to see events and materials as parts of a comprehensive environmental whole. Such a perspective reveals that hospitality SW issues are interdependent on, and intertwined with, the entire spectrum of environmental concerns—both on and beyond our planet. This spectrum includes resource conservation; air, soil, and water quality; the amount and safety of flora and fauna habitats; rational use of land and sea; and the handling and 'after-life' of pollutants of all types (Asimov and Pohl, 1991; Commoner, 1990).

The most basic environmental concerns are for the protection of life, safety, and health. A more recent proposal by the United Nations is that each nation's prosperity is at stake. The essence and extreme of these concerns is that we may be altering our local and global environments in ways which jeopardize chances for our future well-being, and that of those who follow (Smith, 1992). With the biosphere perspective, we are reminded that there is a catch to the mentality of 'Just throw it away!' Among the pitfalls is the fact that, no longer is there an 'away'. In fact, there never was! Whether we burn it, bury it, sink it, or sell it to someone else who must do the same, eventually we must deal with the vexing environmental consequences of the waste we generate (Elmer-Dewitt, 1992).

At the global level, waste quantities are growing, even as disposal options dwindle. According to the Worldwatch Institute, daily MSW output amounts to a per person daily waste of approximately three pounds in Tokyo, 2.4 pounds in Paris, and 1.5 pounds in Rome. Individual output of U.S. inhabitants is the world's highest and growing. A New Yorker discards an average of four pounds of MSW per person per day. A 25% increase in aggregate annual waste is anticipated within just the final decade of the 20th century.

How could environmental problems arise in relation to hospitality SW issues? A handful of examples illustrate the nature of growing concerns. On the materials-input side of the house, based on projections incorporating population and resource usage data, most authorities agree that the world's material resources will not last far into the coming century (Smith, 1992). On the waste disposal side of the issue, internationally, no one wants a disposal facility near where they live; the oft-heard NIMBY syndrome (not in my back yard). Hospitality's SW stream generally ends up in landfills, incinerators (with or without conversion to energy), and often, sewer systems (e.g. via in-house garbage disposals) (Rathje, 1991; Rathje and Psihoyos, 1991). In many European countries and in Japan, some recycling and composting of MSW takes place, while the majority of waste is incinerated (Recycling, 1991). According to the U.S. Environmental Protection Agency, practices in the U.S. at this time include incineration of approximately 10% of MSW, recycling of 10%, and landfilling of 80%. While the aggregate volume of garbage

generated in the U.S. is rising (approaching 200 million tons annually), space in currently operating landfills is fast running out. Most U.S. landfills have been closed within the past decade, either because they are full, or due to environmental protection deficiencies. Many others are nearing capacity (Koelsch, 1991a; Koelsch, 1991b; Rathje, 1991).

Adding to landfill siting difficulties, landfill safety is suspect wherever it is practiced. Gases such as methane from landfills pollute the air. Toxic leachates trickling from landfills are contaminating water world-wide. A single gallon of a household basic such as pesticide or oven cleaner can pollute a million gallons of water (Rathje, 1991). The USEPA has termed the status quo of rising waste quantities and declining disposal capacity 'the solid waste dilemma' (USEPA, 1989). The National Restaurant Association aptly named its publication on the subject 'The Solid Waste Crisis'.

Is waste incineration the easy answer? Air emissions from waste incinerators are considered by many to present serious health risks and liabilities, no matter the sophistication of incinerator scrubbers and filters. Also, many researchers believe that the concentrated toxins in the 10% of ash to which incinerated waste is condensed may be no less potentially lethal than known hazardous chemical or medical wastes. Finally, not all SW is burned or buried. Waste deposited in our seas and in and across our landscapes kills, maims, and pollutes the habitat of life of all types on a daily basis, and diminishes our quality of life (Commoner, 1990; Elmer-Dewitt, 1992).

Environmental concerns are overlapping and far-reaching. Given this, the biosphere view simply is that, within reason, operators should consider environmental impacts of materials and practices used as a *collection of issues* to balance, rather than as isolated, disconnected decisions. Applying the biosphere view becomes an expression of common sense, as in considering the durables-vs-degradables trade-off. Many claim that a waste minimization answer for foodservice disposables is to use either photodegradable or biodegradable products. But the biosphere-framed trade-offs include that the very instability of degradable products in landfills poses a leachate threat. Also, due to their composition, many products manufactured for degradability are therefore difficult if not impossible to recycle. Furthermore, mass composting of mixed MSW is a highly complex and costly proposition. Since few countries or localities have such an infrastructure in place to any degree, most degradable products are still landfilled or burned (Cummings, 1991). If no practical feasibility exists for composting in one's area, then the biosphere view cues that the net outcome of using degradable products is NOT a waste minimization solution. It would NOT decrease resource use. Neither would it diminish material disposal needs locally.

A product life-cycle perspective

Makers of disposable foodservice ware and 'paper linens' argue that warewashing and laundering may be more ecologically damaging than landfilling or incineration of disposables. Which one ultimately is more desirable or less impactful on the environment? Is it the energy and water use, chemical application, and sanitation compromises present in warewashing? Or is it the raw materials' use, incessant processing, and disposal dilemmas of single-use items? This brings us to a product life-cycle view as a guide in waste minimization decisions.

Life-cycle analysis (LCA) is an evaluation performed on products in order to compare the absolute or relative cradle-to-grave costs, virtues, and pitfalls associated with each. In

its scientific form, LCA is a data-based process to evaluate the environmental issues corresponding to a product, process, or activity. LCA involves identifying and quantifying energy and materials used, and wastes released. The investigation involves the entire range of impacts, from extraction and processing of involved raw materials, and including manufacturing, transportation, use requirements, endurance for re-use and recycling, and final disposal (Curran, 1991; Vandermerwe and Oliff, 1992).

Experts disagree among themselves whether life-cycle analysis can provide definitive answers (Wang, 1991). Often testing is elusive, inconclusive, or impossible; interpretations are ambiguous and subjective. Recommendations tend to be unclear and difficult to operationalize. In fact, some municipalities have decided against mandating LCAs due to their necessarily infinite, exhaustive requirements, and to their often-contentious results. However, LCAs can provide a useful frame for in-house decision-making with a waste minimization mentality, even without collecting and analyzing mega-data (Bureau, 1991; Conner, 1991).

Although controversy surrounds recommendations or mandates for 'life-cycle analyses', many nations are creating a 'seal of approval' based thereon. For example, Germany's Blue Angel Seal has been in place since 1978. Canada's Environmental Choice, and Japan's EcoMark seals, among others, have been awarded for several years. And the European Economic Community is struggling with agreements for a 'seal' to certify products that have met particular environmental criteria (Holmes, 1991).

Conclusions

In an encompassing statement, the National Environment Policy Programme adopted in the Netherlands stipulates that 'environmental damage of risks caused by a generation should be solved by that generation itself'. The Dutch contend that sustainable development 'should in no way limit the opportunities of freedom of future generations' (Jansen, 1990). For each operator, operation, and decision point, knowledge, perspective, common sense, and commitment must reign. While compromises and unknowns are inevitable, the above SW minimization actions and views can guide hospitality operators. Operators can work toward optimizing functional productivity and pathways of hospitality materials, while minimizing the quantity and toxicity of solid waste. Simultaneously, decision-makers can avoid short-term waste disposal solutions and superficial resolutions. They can reject responses that meet only the needs of one or more parts of the system, without due consideration of other impacted aspects of our global environment. Using these approaches and perspectives in a global frame, hospitality operators can make an environmentally significant difference in minimizing solid waste.

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